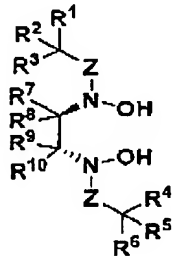
In the Claims:

1. (Cancelled).

2. (Previously Presented) A method of performing a catalytic asymmetric epoxidation comprising:

reacting an alkene or cyclic alkene with catalytic amounts of a chiral bishydroxamic acid ligand and a metal, in the presence of an oxidation reagent, to produce a chiral epoxide, where the chiral bishydroxamic acid ligand has a structure I:



I

where:

R^1, R^2, R^3, R^4, R^5, and R^6 are each independently selected from the group consisting of hydrogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, heteroaryl, and arylalkyl;

or where R^1 and R^2, together with the atom to which they are attached, form a substituted or unsubstituted ring selected from the group consisting of cycloalkyl, heterocyclyl, or aryl;

or where R^4 and R^5, together with the atom to which they are attached, form a substituted or unsubstituted ring selected from the group consisting of cycloalkyl, heterocyclyl, and aryl;

R^7, R^8, R^9, and R^{10} are each independently selected from the group consisting of hydrogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, heteroaryl, and arylalkyl;

or where R^7 and R^9, together with the atoms to which they are attached, form a substituted or non-substituted ring selected from the group consisting of cycloalkyl and heterocyclyl;

—Z— is selected from the group consisting of —C(O)— and —$S(O)_2$—.

3. (Previously Presented) The method of claim 2, where the metal is selected from the group consisting of vanadium (IV), vanadium (V), molybdenum (IV), molybdenum (V), and molybdenum (VI).

4. (Original) The method of claim 3, where the metal is selected from the group consisting of vanadium (IV) and vanadium (V).

5. (Original) The method of claim 3, where the metal is selected from the group consisting of molybdenum (IV), molybendum (V), and molybendum (VI).

6. (Cancelled)

7. (Cancelled)

8. (Cancelled).

9. (Previously Presented) The method of claim 2, where the oxidation reagent is an organic hydroperoxide with the following structure (II):

$$R^{11}\text{-}O\text{-}OH \quad \text{II}$$

where, R^{11} is selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and heterocyclyl.

10. (Cancelled).

11. (Cancelled)

12. (Original) The method of claim 2, where R^1, R^2, R^3, R^4, R^5, and R^6 are each independently selected from the group consisting of hydrogen, alkyl, alkyoxy, and alkylamino.

13. (Original) The method of claim 2, where R^1, R^2, R^3, R^4, R^5, and R^6 are each independently selected from the group consisting of cycloalkyl and heterocyclyl.

14. (Original) The method of claim 2, where R^1, R^2, R^3, R^4, R^5, and R^6 are each independently selected from the group consisting of aryl, arylalkyl, heteroaryl, and halogen.

15. (Original) The method of claim 2, where:

R^1 and R^2, together with the atom to which they are attached, form a substituted or unsubstituted ring;

R^4 and R^5, together with the atom to which they are attached, form a substituted or unsubstituted ring; and

the ring formed by R^1 and R^2 is identical to the ring formed by R^4 and R^5.

16. (Original) The method of claim 2, where R^7, R^8, R^9, and R^{10} are each independently selected from the group consisting of hydrogen, alkyl, alkyoxy, and alkylamino.

17. (Original) The method of claim 2, where R^7, R^8, R^9, and R^{10} are each independently selected from the group consisting of cycloalkyl and heterocyclyl.

18. (Original) The method of claim 2, where R^7, R^8, R^9, and R^{10} are each independently selected from the group consisting of aryl, arylalkyl, and heteroaryl.

19. (Original) The method of claim 2, where R^7 and R^9, together with the atoms to which they are attached, form a ring.

20. (Original) The method of claim 19, where R^8 and R^{10} are identical.

21. (Original) The method of claim 17, where R^7 and R^9, together with the atoms to which they are attached, form a ring.

22. (Original) The method of claim 21, where R^8 and R^{10} are identical.

23. (Original) The method of claim 2, where:

R^1 and R^2 are aryl groups;

R^3 is hydrogen;

R^4 and R^5 are aryl groups; and

R^6 is hydrogen.

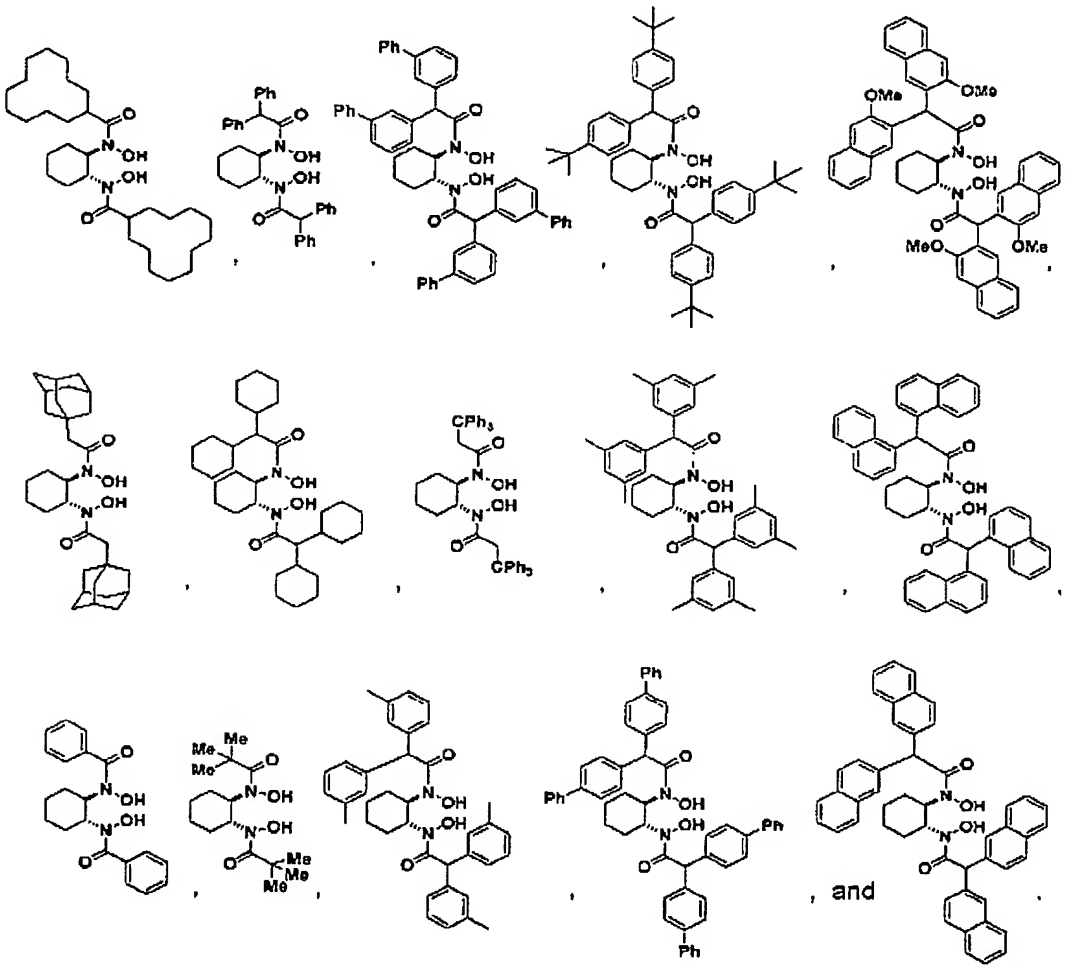
24. (Original) The method of claim 23, where:

R^1 and R^2 are identical; and

R^4 and R^5 are identical.

25. (Original) The method of claim 24, where R^1, R^2, R^4, and R^5 are identical.

26. (Original) The method of claim 2, where the chiral bishydroxamic acid ligand (I) is selected from the group consisting of:



, and

27. (Cancelled).

28. (Cancelled).

29. (Original) The method of claim 3, where the metal is selected from the group consisting of $VO(OPr^i)_3$, $VO(acac)_2$, $VO(OEt)_3$, and $MoO_2(acac)_2$.

30. (Cancelled).

31. (Original) The method of claim 9, where the organic hydroperoxide is selected from the group consisting of tert-butyl hydroperoxide and cumene hydroperoxide.

32. (Original) The method of claim 9, where the organic hydroperoxide is tert-butyl hydroperoxide.

33. (Original) The method of claim 9, where the organic hydroperoxide is cumene hydroperoxide.

34. (Previously Presented) The method of claim 3, where the oxidation reagent is selected from the group consisting of tert-butyl hydroperoxide and cumene hydroperoxide.

35. (Previously Presented) The method of claim 3, where the oxidation reagent is tert-butyl hydroperoxide.

36. (Previously Presented) The method of claim 3, where the oxidation reagent is cumene hydroperoxide.

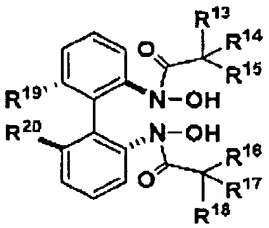
37. (Previously Presented) The method of claim 2, where the oxidation reagent is hydrogen peroxide.

38. (Previously Presented) The method of claim 3, where the oxidation reagent is hydrogen peroxide.

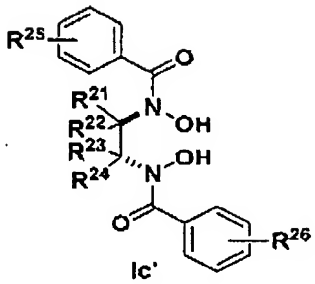
39. (Cancelled).

40. (Cancelled).

41. (Previously Presented) The method of claim 2, where the chiral bishydroxamic acid ligand (I) is selected from the following formulae:



Ib'



Ic'

where:

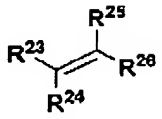
R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, and R^{18} are each independently selected from the group consisting of hydrogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, heteroaryl, and arylalkyl;

R^{19} and R^{20} are each independently selected from the group consisting of hydrogen, halogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, heteroaryl, and arylalkyl;

R^{21}, R^{22}, R^{23}, and R^{24} are each independently selected from the group consisting of hydrogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, heteroaryl, and arylalkyl;

R^{25} and R^{26} are each independently selected from the group consisting of hydrogen, halogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, heteroaryl, and arylalkyl.

42. (Previously Presented) The method of claim 2, where the alkene is of the formula (**X**):



X

where:

R^{23}, R^{24}, R^{25}, and R^{26} are each independently selected from the group consisting of hydrogen, halogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, heteroaryl, and arylalkyl.

43. (Previously Presented) The method of claim 2, where the alkene is a cyclic alkene of the formula (**Xa**):

Xa

where:

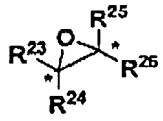
R^{27} and R^{28} are each independently selected from the group consisting of hydrogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, aralklyl, heteroaryl, halogen, and alkene;

n is 1, 2, 3, 4, 5, 6, or 6;

each X is independently selected from the group consisting of —CR'R", —NR'—, and —O—;

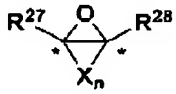
R' and R" are each independently selected from the group consisting of hydrogen, alkyl, cycloalkyl, alkoxy, alkylamino, heterocyclyl, aryl, aralklyl, heteroaryl, and halogen.

44. (Previously Presented) The method of claim 42, where the chiral oxidation product is of the formula (**Xb**):



Xb

45. (Original) The method of claim 43, where the chiral oxidation product is of the formula (**Xc**):



Xa

46. (Previously Presented) The method of claim 2, where the reacting step is carried out in a solvent.

47. (Original) The method of claim 46, where the reacting step is carried out in a solvent selected from the group consisting of methylene chloride, toluene, chloroform, and ethyl acetate.

48. (Previously Presented) The method of claim 2, where the reacting step is carried out at a temperature of about -20 to about 25 °C.

49. (Previously Presented) The method of claim 2, where the reaction is carried out with about 0.001 to about 0.1 equivalents of the chiral bishydroxamic acid ligand (**I**).

50. (Previously Presented)The method of claim 2, where the reaction is carried out with about 0.005 to about 0.05 equivalents of metal.